

JAPAN

EDICT OF GOVERNMENT

In order to promote public education and public safety, equal justice for all, a better informed citizenry, the rule of law, world trade and world peace, this legal document is hereby made available on a noncommercial basis, as it is the right of all humans to know and speak the laws that govern them.

JIS D 9201 (2001) (English): Bicycles -- Method of braking test

ISO INSIDE

安

*The citizens of a nation must
honor the laws of the land.*

Fukuzawa Yukichi

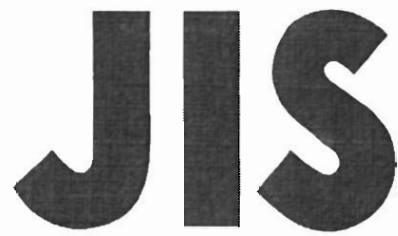
併

BLANK PAGE



BLANK PAGE





JAPANESE
INDUSTRIAL
STANDARD

Translated and Published by
Japanese Standards Association

JIS D 9201 : 2001

[JBPI/BA(J)/JSA]

Bicycles—Method of braking test

ICS 43.150; 43.180

Reference number : JIS D 9201 : 2001 (E)

Foreword

This translation has been made based on the original Japanese Industrial Standard revised by the Minister of Economy, Trade and Industry through deliberations at the Japanese Industrial Standards Committee, as the result of proposal for revision of Japanese Industrial Standard submitted by Japan Bicycle Promotion Institute (JBPI)/Bicycle Association (Japan)/Japanese Standards Association (JSA) with the draft being attached, based on the provision of Article 12 Clause 1 of the Industrial Standardization Law applicable to the case of revision by the provision of Article 14.

Consequently **JIS D 9201 : 1997** is replaced with this Standard.

This revision has been made based on **ISO 4210 : 1996** *Cycles—Safety requirements for bicycles* for the purposes of making it easier to compare this Standard with International Standard; to prepare Japanese Industrial Standard conforming with International Standard; and to propose a draft of an International Standard which is based on Japanese Industrial Standard.

Date of Establishment: 1963-03-01

Date of Revision: 2001-11-20

Date of Public Notice in Official Gazette: 2001-11-20

Investigated by: Japanese Industrial Standards Committee
Standards Board
Technical Committee on Consumer Life
Products

JIS D 9201 : 2001, First English edition published in 2005-11

Translated and published by: Japanese Standards Association
4-1-24, Akasaka, Minato-ku, Tokyo, 107-8440 JAPAN

In the event of any doubts arising as to the contents,
the original JIS is to be the final authority.

© JSA 2005

All rights reserved. Unless otherwise specified, no part of this publication may be reproduced or utilized in any form or by any means, electronic or mechanical, including photocopying and microfilm, without permission in writing from the publisher.

Printed in Japan

MK/AT

Bicycles—Method of braking test

Introduction This Japanese Industrial Standard has been prepared based on the fourth edition of **ISO 4210 Cycles—Safety requirements for bicycles** published in 1996 without modifying the technical contents, except additional **JIS** specifications for the items not specified in the corresponding International Standard.

The portions underlined with dots are the matters not stated in the original International Standard.

1 Scope This Standard specifies the method of braking test for bicycles for general use specified in **JIS D 9111**.

Remarks : The International Standard corresponding to this Standard is as follows:

In addition, symbols which denote the degree of correspondence in the contents between the relevant International Standard and **JIS** are IDT (identical), MOD (modified), and NEQ (not equivalent) according to **ISO/IEC Guide 21**.

ISO 4210:1996 *Cycles—Safety requirements for bicycles* (MOD)

2 Normative references The following standards contain provisions which, through reference in this text, constitute provisions of this Standard. The most recent editions of the standards (including amendments) indicated below shall be applied.

JIS D 9111 Cycles—Classification and essential characteristics

JIS D 9112 Cycle—Tyres—Dimensions

JIS D 9301 Bicycles—General specification

3 Test track The test track shall be as follows:

Further, the track shall be provided with a timing device calibrated to an accuracy of within 2 % for measurement of test velocity, and as required, sloping deck or path as an approach of test run.

- a) **Test track surface** The surface shall be flat and dry, paved with concrete or asphalt, free from loose dirt or gravel, and not less than 0.5 of coefficient of friction to test bicycles wheel tyres.

For braking test under wet conditions, the track surface condition should be kept as constant as possible by the suitable measurement such as sweeping away excessive amounts of water on the surface.

- b) **Gradient of test track** The gradient of test track in running direction shall not exceed 0.5 %.

4 Instrumentation

4.1 Speedometer or tachometer Calibrated speedometer or tachometer, accurate to within $\pm 5\%$ at the travelling speed specified in 5.2.5 of **JIS D 9301** (hereafter referred to as “specified test velocity”), shall be equipped to the test bicycle or parallel run bicycle.

4.2 Velocity recording system The system to record the velocity at the commencement of braking shall be accurate to $\pm 2\%$.

4.3 Distance recording system The system to record the braking distance shall be accurate to $\pm 1\%$.

4.4 Water spray system For braking test under wet conditions, a wetting system capable of a water flow of not less than 4 ml/s simultaneously from each nozzle shall be provided to the test bicycle. The water spray system shall consist of a water reservoir connected by tubing to a pair of nozzles on the front wheel braking part and a pair of nozzles on the rear wheel braking part, and an on/off valve for control flow amount. The sprayed water shall be at ambient temperature.

The nozzles shall be attached at the positions given in attached figures 1 to 6 according to the type of brakes.

5 Test bicycle

5.1 Preparation for test bicycle The test bicycle shall be checked and adjusted for the respective parts, and safely and firmly fitted with the instruments, adjusting mass, and the like.

Each tyre shall be inflated to the marked recommended (maximum value, if the range is mentioned) pressure. Where not marked with any recommendation it shall be in accordance with the recommended pressure specified in **JIS D 9112**.

5.2 Force applied to brakes The brake operation force for the test shall be as follows:

- a) **Hand-operated brakes** Bicycles with hand-operated brakes shall be tested using a handgrip force not exceeding 180 N applied at a point of 25 mm from the end of the lever, and be checked before and after each series of test runs to verify the lever load.

Where a brake lever is operated by an optional brake-force application-device other than manual means, that device shall be set to control the rate of application of the brake force such that 63 % of the specified force shall be reached taking not less than 0.2 s.

- b) **Back-pedal brake** No limitation is placed on the force exerted on the pedals with a back-pedal brake as coaster brake hub.

6 Mass of rider and the others The specified load on test bicycle shall be (100 \pm 1) kg as the combined mass of the bicycle, the rider, the instrumentation and adjusting mass. Where the total of (the maximum value of, if the range is mentioned) manufacturer's specified appropriate rider mass plus bicycle mass is in excess of 100 kg, the bicycle shall be tested at the greater total mass $\pm 1\%$.

7 Test method The test shall be carried out according to the following. Each conceptual diagram of test method under dry and wet condition is shown in figure 1.

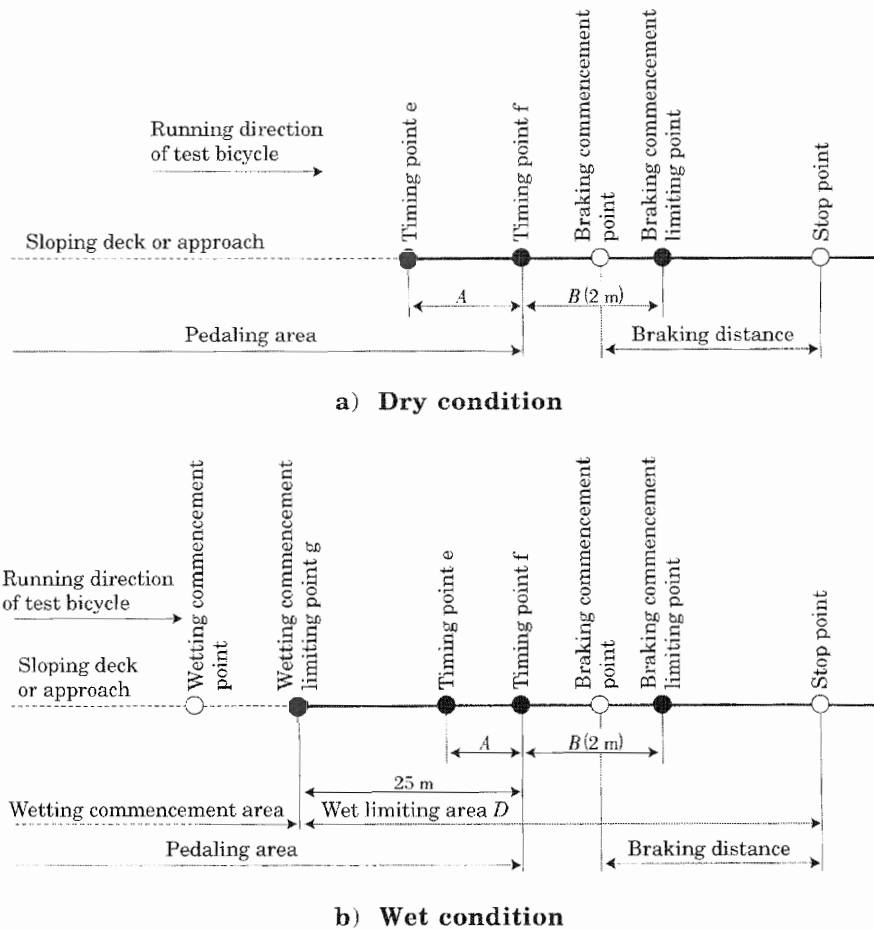


Figure 1 Test methods under dry condition and wet condition

- a) **Wind speed during the test** The test shall be carried out when the wind speed on the track is not exceeding 3 m/s.
- b) **Number of test runs** The number of test runs shall be given in table 1.
- c) **Direction of test run** If the gradient of test track is less than 0.2 %, all runs shall be carried out in the same direction, and if the gradient lies between 0.2 % and 0.5 %, alternate runs shall be carried out in opposite directions.

Table 1 Number of test runs

Running conditions		Gradient of track	
		Less than 0.2 %	Between 0.2 % and 0.5 %
Dry	Consecutive valid runs	5 times	6 times (3 alternate runs)
Wet	Acclimatization runs ⁽¹⁾	2 times	
	Consecutive valid runs	5 times	6 times (3 alternate runs)

Note ⁽¹⁾ Shall be carried out prior to consecutive valid runs.

Remarks : A rest period not exceeding 3 min may be taken between successive runs.

- d) **Measurement of velocity at commencement of braking** Providing timing points e and f on the track, the time for the bicycle path through the distance A between e and f (hereafter referred to as “timing area”) shall be measured to determine the velocity at commencement of braking. The timing area A should be suitable distance for the measurement means.
- e) **Braking commencement area** The braking commencement area B shall be for the distance of 2 m from the timing point f, and may preliminarily be marked on the track.
- f) **Traveling and braking** The rider shall, keeping the specified velocity of the test bicycle, stop the pedaling just before the timing point f and then, with the area B, apply the brake by the operation force specified in 5.2.
- g) **Commencement and stopping of water flow** Setting the wetting commencement point g, at 25 m prior to the timing point f, from which a wetting area D is provided for the stop point of the bicycle, the water flow shall commence prior to the bicycle reaching the point g, and continue until the bicycle comes to rest in the test of wet condition.
- h) **Measurement of braking distance** The straight distance between the early braking commencement point and the stop point shall be measured to determine the braking distance (referred to as “measured braking distance”).

8 Correction of braking distance The measured braking distance shall be corrected from the following formula (referred to as “corrected braking distance”).

$$L_2 = L_1 \left(\frac{V}{V_1} \right)^2$$

where, L_2 : corrected braking distance (m)
 L_1 : measured braking distance (m)
 V : specified test velocity (km/h)
 V_1 : measured velocity at the commencement of braking (km/h)

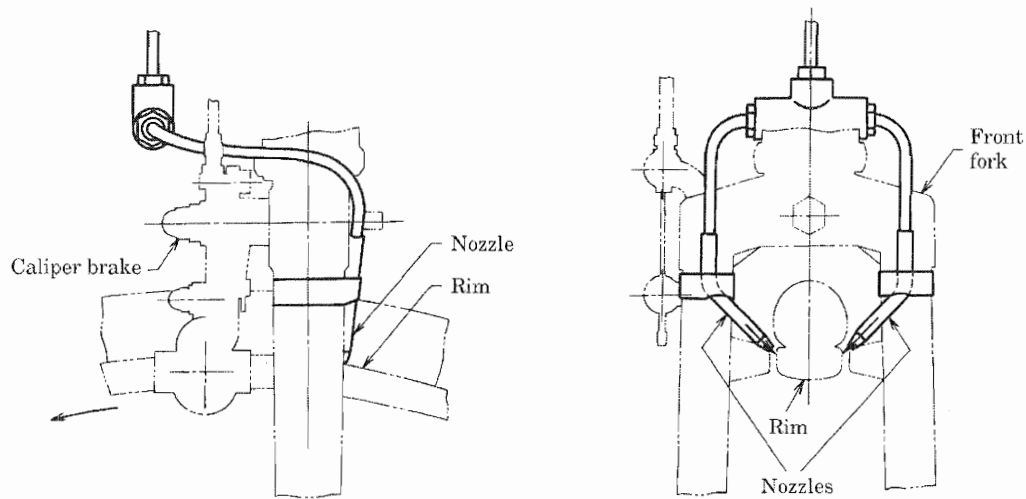
9 Validity of test runs Validity of test runs shall be as follows:

- a) A test run shall be considered invalid if:
 - 1) excessive side-skid, or
 - 2) loss of control occurs.
- b) If the corrected braking distance exceeds the specified braking distance specified in **5.2.5** of **JIS D 9301** (hereafter referred to as “specified braking distance”), a test run shall be considered invalid if:
 - 1) the measured velocity at the commencement braking exceeds the specified test velocity by more than 1.5 km/h,
 - 2) the front brake is activated after the rear brake, or
 - 3) the travelling distance between each activated point of front and rear brake exceeds 1 m.
- c) If the corrected braking distance is less than the specified braking distance, a test run shall be considered invalid if:
 - 1) the measured velocity at the commencement of braking is more than 1.5 km/h below the specified test velocity,
 - 2) the activation point of the rear brake exceeds the braking commencement limiting point.

10 Test results The result of the braking test shall be recorded in the test report generally about the following items.

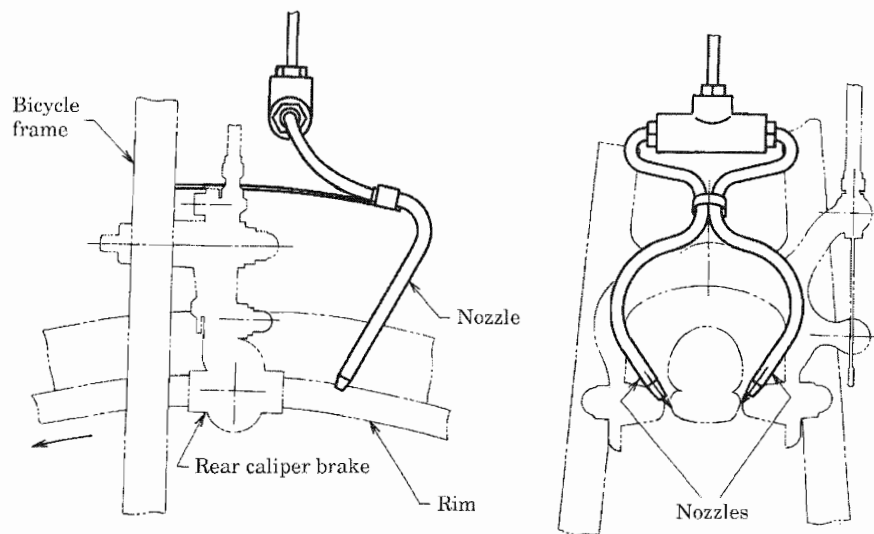
- a) Test division (distinction of dry or wet condition)
- b) Date and time of test, weather, air temperature, wind direction and wind speed
- c) Test place, surface condition and gradient of test track
- d) Name of test operator (measurer)
- e) Classification and type of brake of test bicycle
- f) Inflation pressure of front and rear wheel tyres
- g) Brake operation force
- h) Number of test runs
- i) Validity of test runs
- j) Matters relating to mass
 - 1) Self-mass of test bicycle
 - 2) Body weight of test rider
 - 3) Mass of instrumentation
 - 4) Adjusting mass

- 5) Sum of loading masses of test rider, instrumentation, and adjusting mass for the test [2) + 3) + 4)]
- 6) Combined total mass of test bicycle [1) + 5)]
- k) Items relating to velocity
 - 1) Specified test velocity
 - 2) Measured velocity at the commencement of braking
 - 3) Difference between the specified test velocity and measured velocity at the commencement of braking
- l) Braking distance
 - 1) Specified braking distance
 - 2) Measured braking distance
 - 3) Corrected braking distance
 - 4) Average corrected braking distance
- m) Braking conditions and remarks



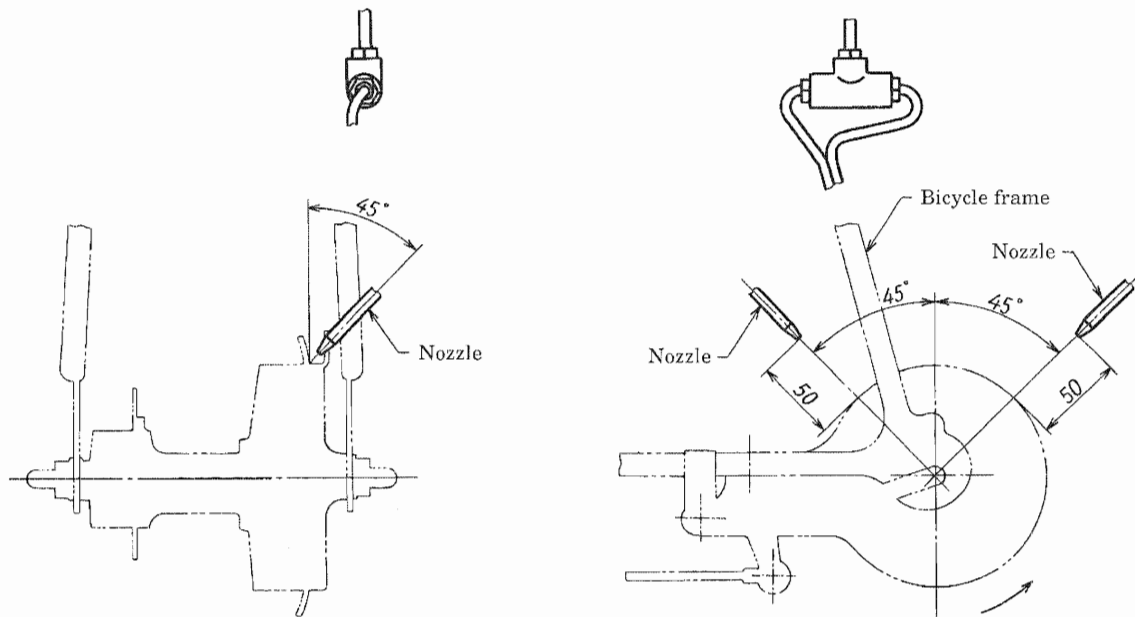
Remarks : The nozzle position for front pull-up rim brake shall be similar to this.

Attached Figure 1 Nozzle position for front caliper brake



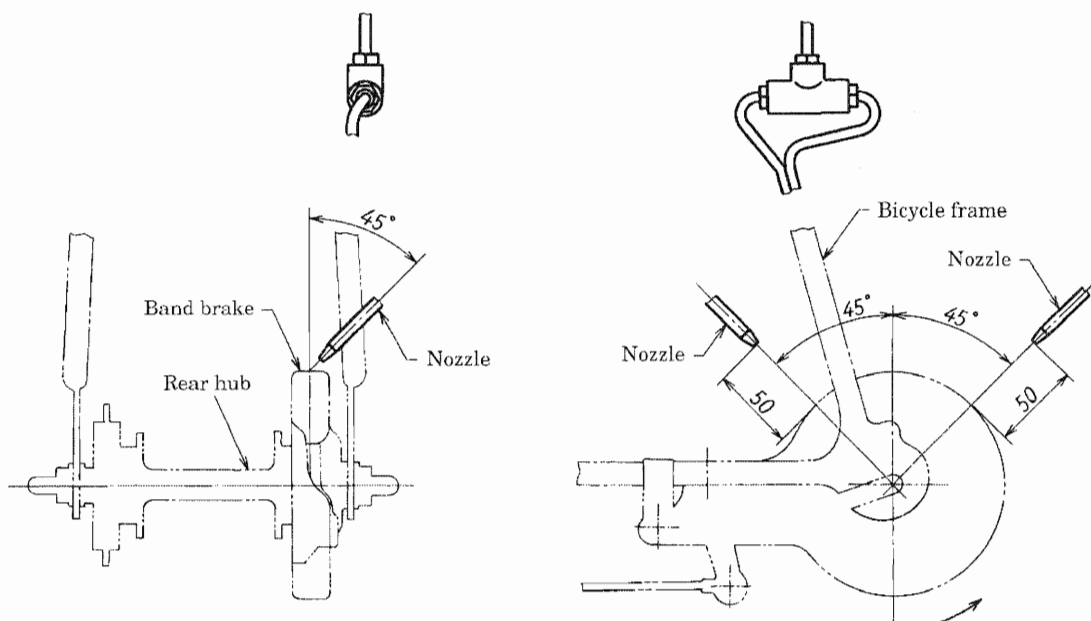
Attached Figure 2 Nozzle position for rear caliper brake

Unit: mm

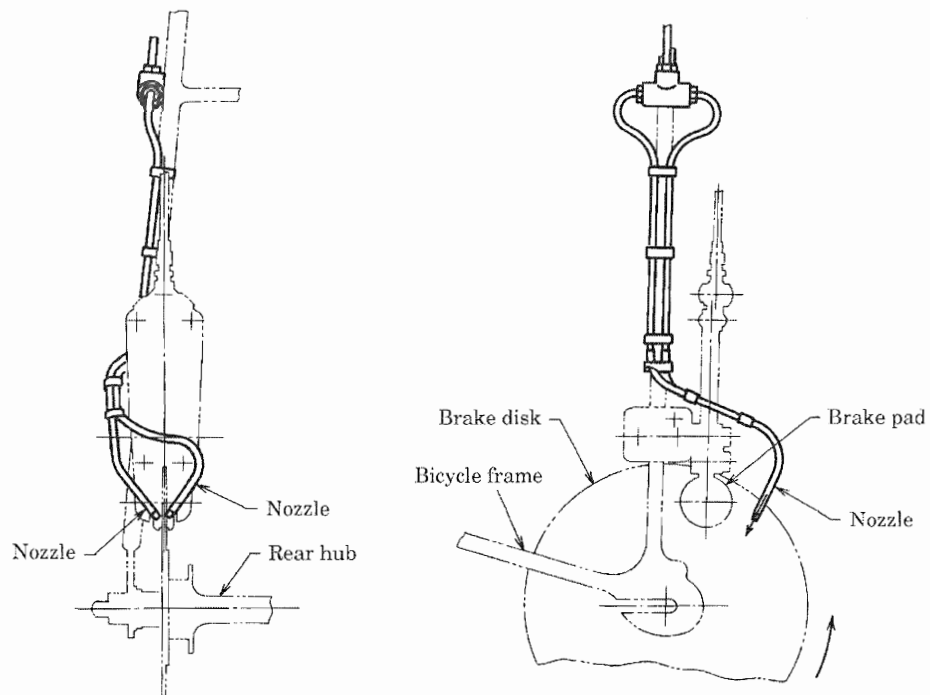


Attached Figure 3 Nozzle position for internal expanding brake

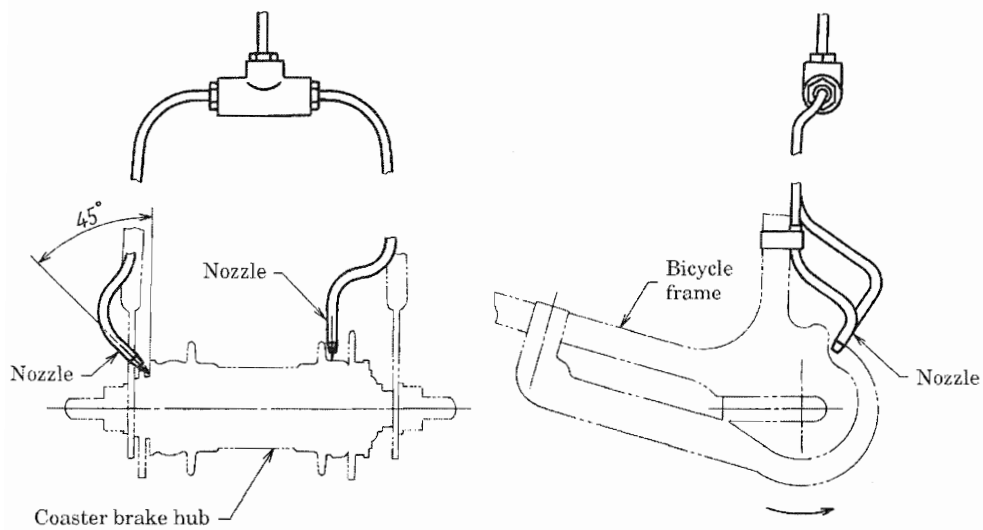
Unit: mm



Attached Figure 4 Nozzle position for band brake



Attached Figure 5 Nozzle position for disk brake



Remarks : Water nozzle to be directed at hub ingress, both sides.

Attached Figure 6 Nozzle position for coaster brake hub

Annex (informative)
Comparison table between JIS and corresponding International Standard

JIS D 9201 : 2001 <i>Bicycles—Method of braking test</i>				ISO 4210 : 1996 <i>Cycles—Safety requirements for bicycles</i>			
(I) Requirements in JIS		(II) International Standard number	(III) Requirements in International Standard		(IV) Classification and details of technical deviation between JIS and the International Standard by clause Location of deviation: text Indication method: dotted underlines		(V) Justification for the technical deviation and future measures
Clause	Content		Clause	Content	Classification by clause	Detail of technical deviation	
1 Scope	Method of braking test for general use bicycles	ISO 4210	1.1	Safety requirements for bicycles including method of braking test	MOD/alteration	JIS specifies only requirements for method of braking test separately.	Other safety requirements than this are covered by the relevant JIS standards respectively.
2 Normative references	JIS D 9111 JIS D 9112 JIS D 9301		1.2	ISO 5775-1, -2 ISO 6742-1, -2 and others	MOD/alteration	JIS refers to the relevant JIS standard according to the content of each one.	These JIS standards are generally corresponding to the relevant ISO .
3 Test track	Timer equipment with error tolerance level ± 2 %, tilting table, a ramp		4.3.2	None	MOD/addition	JIS adds installation of timing and approach devices.	These JIS requirements are effective to ensure exactness of the test conditions.
a) Test track surface	Smooth concrete or asphalt paving with friction coefficient over 5 % against tyre		4.3.2.3	Identical with JIS .	IDT		
b) Gradient of test track	0.5 % or over gradient for direction of travel		4.3.2.2	Identical with JIS .	IDT		

(I) Requirements in JIS		(II) International Standard number	(III) Requirements in International Standard		(IV) Classification and details of technical deviation between JIS and the International Standard by clause Location of deviation: text Indication method: dotted underlines		(V) Justification for the technical deviation and future measures
Clause	Content		Clause	Content	Classification by clause	Detail of technical deviation	
4 Instrumentation		ISO 4210					
4.1 Speedometer or tachometer	Speedometer or tachometer with speed error of $\pm 5\%$		4.3.3.1	Identical with JIS .	IDT		
4.2 Velocity recording system	$\pm 2\%$ accuracy		4.3.3.2	Identical with JIS .	IDT		
4.3 Distance recording system	$\pm 1\%$ accuracy		4.3.3.3	Identical with JIS .	IDT		
4.4 Water spray system	Applied flow of 4 ml/s with a pair of nozzle for each break at back and forth, consist of reservoir water tank and switching valve.		4.3.3.4	Identical with JIS .	IDT		
5 Test bicycle							
5.1 Preparation for test bicycle	To check and adjust every part, fit the instruments, etc. safely and firmly and adjust each tyre air pressure (adjust to the standard air pressure when not indicated).		4.3.1	After completion of brake system load test, to re-adjust brakes, and inflate testing tyre.	MOD/alteration	JIS does not specifies brake system load test. Provisions other than break and air pressure adjustment were added.	JIS had specified differently to execute test properly.
5.2 Force applied to brakes							
a) Hand-operated brakes	To be 180 N max. at 25 mm from the lever end each. For using an application-device, to be required 0.2 s min. for reaching 63 % of the specified force.		4.3.5.1, 4.3.5.2	Identical with JIS .	IDT		

(I) Requirements in JIS		(II) International Standard number	(III) Requirements in International Standard		(IV) Classification and details of technical deviation between JIS and the International Standard by clause Location of deviation: text Indication method: dotted underlines		(V) Justification for the technical deviation and future measures
Clause	Content		Clause	Content	Classification by clause	Detail of technical deviation	
b) Back-pedal brake	No limitation on the pedal force.	ISO 4210	4.3.5.3	Identical with JIS .	IDT		
6 Mass of rider and the others	(100 ± 1) kg		4.3.4	Identical with JIS .	IDT		
7 Test method a) Wind speed during the test	3 m/s max.		4.3.2.5	Identical with JIS .	IDT		
b) Number of test runs	Track gradient less than 0.2 %: 5 runs in the same direction		4.3.6.3	Identical with JIS .	IDT		
c) Direction of test run	Track gradient 0.2 % to 0.5 %: 3 alternate runs in opposite directions		4.3.2.2	Identical with JIS .	IDT		
d) Measurement of velocity at commencement of braking	Setting a timing area, to measure velocity at the commencement of braking.		—	None	MOD/ addition	JIS adds this item.	JIS regards this item as necessary to ensure accuracy of the velocity for correction of braking distance and to confirm validity of test runs.
e) Braking commencement area	The area for 2 m from the later timing point.		—	None	MOD/ addition	JIS adds this item.	JIS specifies this item to ensure validity of test runs.

(I) Requirements in JIS		(II) International Standard number	(III) Requirements in International Standard		(IV) Classification and details of technical deviation between JIS and the International Standard by clause Location of deviation: text Indication method: dotted underlines		(V) Justification for the technical deviation and future measures
Clause	Content		Clause	Content	Classification by clause	Detail of technical deviation	
f) Traveling and braking	Keeping the specified travelling velocity, to stop the pedaling within the braking area and then apply the brake.	ISO 4210	4.3.6.1 4.3.6.2	Identical with JIS .	IDT		
g) Commencement and stopping of water flow	To commence water flow at 25 m prior to the timing point to continue until the bicycle comes to rest.		4.3.6.2	Identical with JIS .	IDT		
h) measurement of braking distance	To measure the straight distance between the early braking commencement and stop points.		1.3.6	Identical with JIS .	IDT		
8 Correction of braking distance	Specifies correction method of measured braking distance.		4.3.7	Identical with JIS .	IDT		
9 Validity of test runs	Specifies conditions of test run to be considered invalid.		4.3.8	Identical with JIS .	IDT		

(I) Requirements in JIS		(II) International Standard number	(III) Requirements in International Standard		(IV) Classification and details of technical deviation between JIS and the International Standard by clause Location of deviation: text Indication method: dotted underlines		(V) Justification for the technical deviation and future measures
Clause	Content		Clause	Content	Classification by clause	Detail of technical deviation	
10 Test results	Specifies the items to be reported.	ISO 4210	4.3.9	Average of corrected braking distances.	MOD/alteration	JIS specifies other provisions additionally than average of corrected braking distances.	The additional items in JIS is required to clarify the detail situation of the test.

Designated degree of correspondence between **JIS** and International Standard: MOD

Remarks 1 Symbols in sub-columns of classification by clause in the above table indicate as follows:

- IDT: Identical in technical contents.
- MOD/addition: Adds specification item(s) or content(s) which are not included in International Standard.
- MOD/alteration: Alters the specification content(s) which are included in International Standard.

2 Symbol in column of designated degree of correspondence between **JIS** and International Standard in the above table indicates as follows:

- MOD: Modifies International Standard.

Errata for JIS (English edition) are printed in *Standardization Journal*, published monthly by the Japanese Standards Association, and also provided to subscribers of JIS (English edition) in *Monthly Information*.

Errata will be provided upon request, please contact:

Standardization Promotion Department, Japanese Standards Association

4-1-24, Akasaka, Minato-ku, Tokyo, 107-8440 JAPAN

TEL. 03-3583-8002 FAX. 03-3583-0462